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II. — SCIRPUS ERIOPHORUM AND SOME RELATED FORMS.

In July, 1891, while collecting in the Saco valley about Cornish, Maine, I was puzzled by a strange "wool-grass" which there abounded in the low thickets and meadows. Eventually, however, the plant was consigned, with some other very different forms, to the one place provided for it in the American manuals — *Scirpus Eriophorum*, Michx. (*Eriophorum cyperinum*, L.). Again in 1896, my attention was called by Mr. J. C. Parlin to another "wool-grass" in southern Maine, which in size, color, and fruiting season was very unlike the common species of northern New England; and more recently Messrs. Luman Andrews and Chas. H. Bissell have made careful field-notes about Southington, Connecticut, on three very dissimilar plants, all of which we must call, if we adhere to the present treatment of the group, *Scirpus Eriophorum*. Two other forms, one from Maine and Massachusetts, the other from the southeastern and Gulf States, have been associated with this species, which, as now made up, includes six readily distinguished forms.

Linnæus described *Eriophorum cyperinum*[1] in 1762, basing it upon earlier descriptions of Rai,[2] Plukenet,[3] and Gronovius.[4] The Linnean species is a well known plant of eastern America, rather stout, the involucre ferruginous at base, and the small ovoid ferruginous spikelets clustered in glomerules. Uncommon in northern New England, it becomes abundant southward, extending at least to Kentucky.

In 1803, Michaux described as *Scirpus Eriophorum*[5] a southern plant (from Virginia to Georgia), and supposing it to be the same as the Linnean *Eriophorum cyperinum*, he transferred to it the latter species. Michaux's plant, however, though apparently an extreme form of the Linnean species, has the spikelets nearly all distinctly pedicelled, and it is a form of more southern range than the Linnean plant. During the present century these plants have been variously treated, as a single species or as varietally distinct, under *Scirpus* or *Eriophorum*, and by Persoon even as part of a separate genus, *Tricophorum*.[6] Ordinarily, Michaux's disposition of the plant as a *Scirpus* has been accepted, and, although the plant somewhat approaches species of *Eriophorum*, its habit is that of many *Scirpi*, and it seems much better placed there than in the other genus.

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[1] L. Spec. ed. 2, 77.
[2] Rai, Suppl. 620.
[3] Pluk. Mant. 62, t. 419, f. 3.
[4] Gronov. Virg. 11.
[5] Michx. Fl. i. 33.
[6] Pers. Syn. i. 69.

As stated, the plants of Linnæus and his predecessors and of Michaux, both of which are probably extremes of a single species, are coarse plants most common from southern New England southward. The base of the involucre and the spikelets are ferruginous, and the long tangled bristles are also reddish brown, and in the fall, when the plants are mature, the ample inflorescences have the appearance of loose reddish brown masses of short wool. That this plant was clearly identified by American systematists early in this century is shown, not only by their descriptions, but by the English name "Red cotton-grass,"[1] sometimes employed by them.

Not until 1836, however, in Torrey's monograph of the *Cyperaceæ*, was the slender and uniformly smaller greenish-brown or drab "wool-grass," familiar to all botanists of New England and Canada, noted in botanical works; although from a manuscript note made by Dr. Gray while examining the Michaux herbarium, it seems that Michaux collected the smaller northern plant at Lake Mistassini, and that in the herbarium Lestiboudois had treated it as an undescribed species. In his monograph Torrey described the plant without a name as a variety of *Scirpus Eriophorum* (*S. Eriophorum* η[2]). Apparently the next reference to the plant is in the first edition of the Manual, where, under *Scirpus Eriophorum*, Dr. Gray says, "and northward are slender, less leafy forms, with much smaller umbels, and greenish-brown scattered small heads."[3]

The slender northern plant, with the involucre black below and with greenish black scales and dull brown or dark bristles, by all means the commonest "wool-grass" north of Boston, does not seem to have received much further attention. In subsequent discussions of the group it has been united with the now clearly identified ferruginous coarse plant of more southern range. The latter plant, the true *Scirpus Eriophorum*, Michaux, and its var. *cyperinus* (*Eriophorum cyperinum*, L.) are usually not mature until late August or September (the average date of collection, without regard to locality, of the specimens examined is September 1), while the slender northern plant, the *S. Eriophorum* η, Torrey, is generally mature in late June or in July (average date July 18), though its dead-ripe woolly umbels may remain in recognizable condition until late fall. This striking difference between the fruiting seasons of the two plants, as well as the pronounced differences in size, aspect, and range, is sufficient evidence that the common drab "wool-grass" of our northern meadows and low thickets should no longer be confused with the more southern and coarser ferruginous species with which it has been so generally associated.

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[1] Bigel. Fl. Bost. 16.

[2] Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 331.

[3] Gray, Man. 528.

A very handsome plant, unlike anything which seems to have been formerly described, is found by Mr. Luman Andrews in Connecticut. The plant is apparently an extreme form of *Scirpus Eriophorum*, but unlike that species or its var. *cyperinus*, with short ovoid spikelets, this stout plant has the glomerulate oblong spikelets often 1 cm. in length. Occasional luxuriant specimens of *S. Eriophorum*, however, are found with the spikelets more elongated than in the type, thus connecting the Connecticut plant directly with that species.

The plants which have heen associated as *Scirpus Eriophorum* may be defined as follows.

* Culms stout (just below the involucre averaging 3 mm. in diameter), about 1.25 (rarely 1.5) m. high: leaves 4.5 to 11 (average 6) mm. wide: involucre usually ferruginous at base: scales and bristles ferruginous.

S. Eriophorum, Michx. Inflorescence ample, 1.5 to 2.5 dm. high; the dichotomous rays of the umbel elongated and drooping at the tips: spikelets ovate or ovoid-oblong, 3.5 to 6 (average 4.5) mm. long, clustered at the tips of the branchlets, the lateral mostly on distinct generally elongated pedicels. — Fl. i. 33; Torr. Fl. N. and Middle States, i. 50, Ann. Lyc. Nat. Hist. N. Y. iii. 331 (including α & γ), & Fl. N. Y. ii. 356, in part; Kunth, Enum. ii. 170; Gray, Man. ed. 2, 501 (including var. *laxus*); Böckl. Linnæa, xxxvi. 731, in part. *S. eriophorus*, Vahl. Enum. ii. 282; Rœm. & Schultes, Syst. ii. 147. *S. thyrsiflorus*, Willd. Enum. Pl. Hort. Berol. 78. *S. cyperinus*, Kunth, var. *Eriophorum*, Britton, Trans. N. Y. Acad. Sci. xi. 82, in part; Britton & Brown, Ill. Fl. i. 271, in part. *Trichophorum cyperinum*, Ell. Sk. i. t. 3, f. 4, not Pers. *Eriophorum cyperinum*, L., var. *laxum*, Wats. & Coult. in Gray, Man. ed. 6, 582, in part. — Common in the southeastern and Gulf States, extending westward to Louisiana and north to Arkansas and New Jersey. Perhaps of more northern range, but as yet too little collected in condition mature enough for satisfactory identification. The following specimens are referred here: — New Jersey, Woodbridge, Sept. 21, 1889, and Barnegat Bay, Aug. 25, 1892 (*J. R. Churchill*): Virginia, Bedford Co., Sept. 1, 1871 (*A. H. Curtiss*); Northwest, Norfolk Co., Sept. 23, 1892, Sept. 6, 1893 (*A. A. Heller*, nos. 762, 1257): South Carolina, Aiken

(*H. W. Ravenel*): FLORIDA, Tallahassee, Aug. 12, 1895 (*Geo. V. Nash*, no. 2404); without locality (*Chapman*): GEORGIA (*Baldwin*): ALABAMA (*Drummond*): LOUISIANA (*Hale*): ARKANSAS, southern portion of State, July (*F. L. Harvey*, no. 17). Passing gradually to the northern

Var. CYPERINUS, Gray. Inflorescence ample, the rays stiffer and less pendulous than in the species; base of involucre less ferruginous; spikelets paler, sessile or subsessile in glomerules of 3 or more. — Man. ed. 2, 501. *S. Eriophorum β*, Torr. Ann. Lyc. Nat. Hist. N. Y. iii. 331; Böckl. Linnæa, xxxvi. 732. *S. cyperinus*, Kunth. Enum. ii. 170; Britton, Trans. N. Y. Acad. Sci. xi. 82; Britton & Brown, Ill. Fl. i. 271, f. 636. *Eriophorum cyperinum*, L. Spec. ed. 2, 77; Bigel. Fl. Bost. 16; Wats. & Coult. in Gray, Man. ed. 6, 582. *Tricophorum cyperinum*, Pers. Syn. i. 69; Pursh, Fl. i. 57; Muhl. Gram. 47. — Of more northern range than the species, from Maine to Illinois and Kentucky. MAINE, Mattawamkeag Lake, Sept. 7, 1897 (*M. L. Fernald*); Fitts Pond, Clifton, Sept., 1898 (*M. L. Fernald*); Mt. Desert Island, Aug., Sept., 1889–91 (*E. L. Rand, J. H. Redfield*); North Berwick, Sept., 1896 (*J. C. Parlin*); Wells, July 29, 1886 (*W. Deane*): NEW HAMPSHIRE, Rye Beach, Aug. 29, 1886 (*W. Deane*): MASSACHUSETTS, East Gloucester, Aug., 1881 (*C. W. Swan*); Sherman's Pond, Waltham, Sept. 3, 1853 (*Wm. Boott*); Round Pond, Woburn, Aug. 16, 1868 (*Wm. Boott*); bog, Medford, Aug. 19, 1894 (*W. P. Rich*); Boston, Sept. 8, 1881 (*C. W. Swan*); Blue Hills, Aug. 15, 1894 (*W. H. Manning*): RHODE ISLAND, Providence (*S. T. Olney, Geo. Thurber*): CONNECTICUT, Southington, Aug. 13, 1896 (*C. H. Bissell*, no. 707), Sept. 11, 1898 (*Luman Andrews*, no. 432, in part): MICHIGAN, Alma, Aug. 24, 1893 (*C. A. Davis*): ILLINOIS, Mound City, Aug., 1862 (*Geo. Vasey*): KENTUCKY, Clear Creek, Bell Co., Sept., 1893 (*T. H. Kearney, Jr.*, no. 428).

Var. **condensatus.** Rays of the umbel shortened (only 6 cm. or less in length): glomerules of many spikelets short-peduncled or subsessile in a few dense masses 2 to 5 cm. in diameter. — *S. Eriophorum ζ*, Torr. l. c. 331? — Marshes, Hammond's Pond, Newton, Massachusetts, Aug. 23, 1854 (*Wm. Boott*); also at Seal Harbor, Mt. Desert Island, Maine, Sept. 4, 1891 (*J. H. Redfield*); Lynnfield, Mass., July 13, 1879 (*H. A. Young*); Everett, Mass., Aug. 6, 1892 (*W. P. Rich*).

Var. **Andrewsii.** Rays of umbel elongated and pendulous as in the species: spikelets oblong, 7 to 10 mm. long, mostly in glomerules of from 3 to 15. — Southington, Connecticut, Sept. 11, 1898 (*Luman Andrews*, no. 432, in part).

* * Culms more slender (averaging 1.5 mm. in diameter), about 8 (rarely 11) dm. high: leaves 2 to 5 (average 3.5) mm. wide: involucre black at base: scales greenish-black: bristles drab or olive-brown, not ferruginous.

S. atrocinctus. Inflorescence 0.5 to 1.5 dm. high; the dichotomous rays of the umbel slender, elongated and drooping at the tips: spikelets ovate to ovoid-oblong, 3 to 6 mm. long, scattered on slender pedicels, or in glomerules of from 3 to 6, the outer generally distinctly pedicelled. — *S. Eriophorum* η, Torr. l. c. 331. *S. Eriophorum*, Torr. Fl. N. Y. ii. 356; Gray, Man. 528; Böckl. Linnæa, xxxvi. 731; in part. *S. Eriophorum*, Michx., var. *laxus*, Gray, Man. ed. 2, 501, in part. *S. cyperinus*, Kunth, var. *Eriophorum*, Britton, Trans. N. Y. Acad. Sci. xi. 82; Britton & Brown, Ill. Fl. i. 271; in part. *Eriophorum cyperinum*, L., var. *laxum*, Wats. & Coult. in Gray, Man. ed. 6, 582, in part. — The common species of the northeastern States and Canada, from Prince Edward Island and Lake Mistassini to the Saskatchewan, south to Connecticut, western New York, and Iowa. Specimens examined: — PRINCE EDWARD ISLAND, Beackley Point, Aug. 24, 1888 (*John Macoun*): ONTARIO, Nipigon River, July 20, 1884 (*John Macoun*): MANITOBA, Lake Winnipeg Valley, 1857 (*E. Bourgeau*): SASKATCHEWAN, without more definite locality, 1858 (*E. Bourgeau*): MAINE, Fort Fairfield, 1881 (*Kate Furbish*); Orono, July 4, 1889 (*M. L. Fernald*); Northeast Harbor, July, 1883 (*E. L. Rand, R. W. Greenleaf*); Sargent Mt., Mt. Desert Island, Aug. 6, 1883 (*R. W. Greenleaf*); Long Pond Meadows and "The Cleft," Seal Harbor, July 28, Aug. 7, 1890 (*J. H. Redfield*); Bubble Pond, Mt. Desert Island, Aug. 13, 1890 (*J. H. Redfield*); Rumford, July 4, 1890 (*J. C. Parlin*); North Berwick, June, 1892 (*J. C. Parlin*); Wells, July 1, 1898 (*Kate Furbish*): NEW HAMPSHIRE, Crawford Notch, July 28, 1853 (*Wm. Boott*); Randolph, July 28, 1897 (*E. F. Williams*); Shelburne, Aug. 12, 1883 (*W. Deane*); Jackson, July 29, 1890 (*J. R. Churchill*); Tuckerman's Ravine, Mt. Washington, Aug. 28, 1889 (*J. R. Churchill*); East Jaffrey, July 19, 1897 (*B. L. Robinson*, no. 325): MASSACHUSETTS, Lynnfield, July 19, 1854 (*Wm. Boott*); Lowell, July 9, 1882 (*C. W. Swan*); Chelmsford, July 24, 1882 (*C. W. Swan*); Fresh Pond, Cambridge, June 15, 1853 (*Wm. Boott*); Boston, June 27, 1881 (*C. W. Swan*); Sharon, July 1, 1894 (*E. F. Williams*); summit, Greylock Mt., Aug. 4, 1898 (*J. R. Churchill*): RHODE ISLAND, Providence (*S. T. Olney*): CONNECTICUT, Southington, June 29, 1898 (*Luman Andrews*, no. 431), June 30, 1898 (*C. H. Bissell*, no. 706); NEW YORK, in the Lake region (*Asa Gray*): MICHIGAN, Keweenaw Co., Aug., 1890 (*O. A. Farwell*, no. 756); Round Island, Lake Superior, Aug. 2, 1875

(*Henry Gillman*, no. 12): IOWA, Clinton Co., July 1, 1878 (*Geo. D. Butler*). Passing to

Var. **brachypodus.** Spikelets subsessile or on shortened pedicels, in a capitate or subcapitate cluster 2 to 4 cm. in diameter; inflorescence occasionally with one or two elongated rays. — With the species, or more often by itself in wet meadows or swamps. Apparently the common form in Newfoundland. — NEWFOUNDLAND, St. John's, Aug. 3, 1894 (*Robinson & Schrenk*, no. 65); without locality, 1835 (from Herb. J. Gay, collector unknown): MAINE, Dead River, Aug. 13, 1896 (*M. L. Fernald & W. C. Strong*, no. 482); Hartford, July, 1892 (*J. C. Parlin*); Cornish, July 21, 1891 (*M. L. Fernald*); Wells, July 8, 1898 (*Kate Furbish*): NEW HAMPSHIRE, Randolph, July 10, 1894 (*E. F. Williams*); above the woods, Mt. Monadnock, Aug. 10, 1883 (*C. W. Swan*); Jaffrey, Aug. 3, 1890 (*W. Deane*); near East Jaffrey, July 9, 1897 (*B. L. Robinson*, no. 326): VERMONT, Willoughby Lake, Aug. 3, 1885 (*W. Deane*): MASSACHUSETTS, Reading, July 12, 1882 (*C. E. Perkins*).

EXPLANATION OF PLATE.

Eleocharis obtusa: Fig. 1, small head; Figs. 2, 3, scales; Figs. 4, 5, 6, 7, achenes.

E. obtusa, var. *gigantea*: Figs. 11, 12, achenes.

E. obtusa, var. *jejuna*: Fig. 13, head; Fig. 14, achene.

E. ovata: Fig. 8, scale; Figs. 9, 10, achenes.

E. ovata, var. *Heuseri*: Fig. 15, head; Figs. 16, 17, 18, 19, 20, achenes; Figs. 21, 22, scales.

E. olivacea: Fig. 23, head; Fig. 24, achene.

E. intermedia: Fig. 25, head; Fig. 26, achene.

E. Macounii: Fig. 26^a, achene.

E. lanceolata: Fig. 27, head; Fig. 28, scale; Fig. 29, achene.

E. Engelmanni: Figs. 37, 38, 39, 40, achenes.

E. Engelmanni, var. *detonsa*: Fig. 30, head; Figs. 31, 32, 33, scales; Figs. 34, 35, 36, achenes.

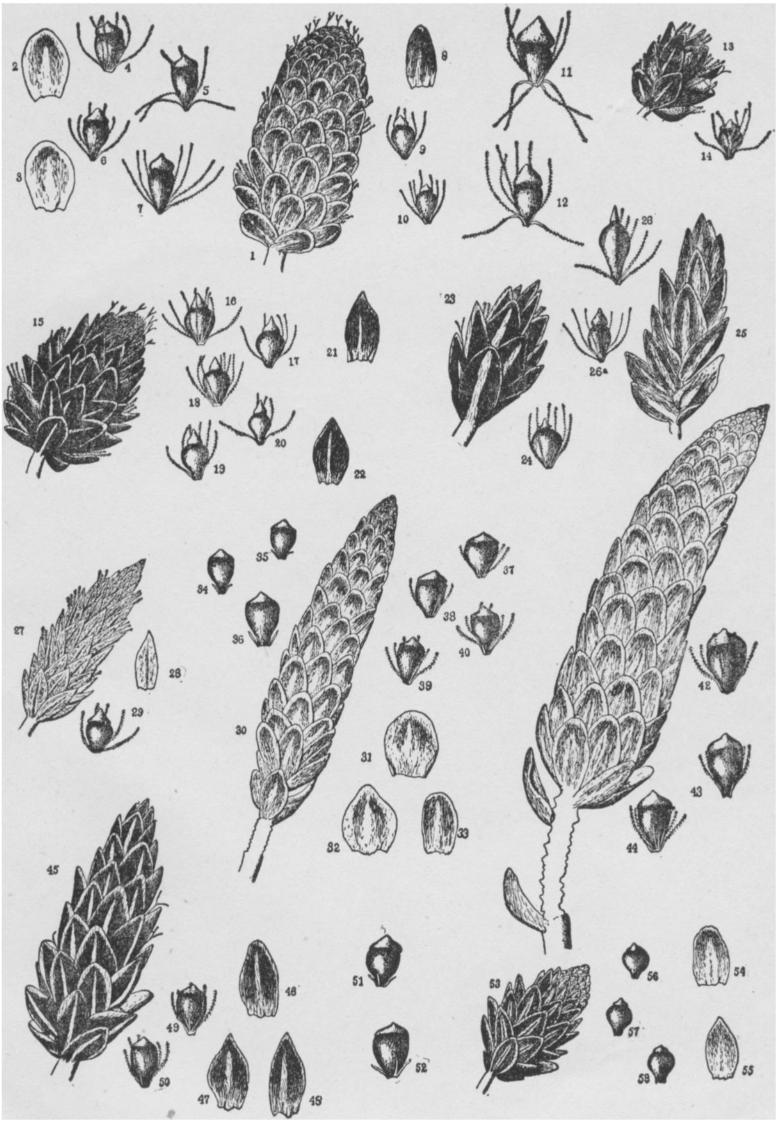
E. Engelmanni, var. *robusta*: Fig. 41, head; Figs. 42, 43, 44, achenes.

E. monticola: Fig. 45, head; Figs. 46, 47, 48, scales; Figs. 49, 50, achenes.

E. monticola, var. *leviseta*: Figs. 51, 52, achenes.

E. diandra: Fig. 53, head; Figs. 54, 55, scales; Figs. 56, 57, 58, achenes.

M. L. FERNALD. — ELEOCHARIS.



M.L.F. DEL.